PATHOLOGY

Learning Objectives

At the end of the course, the learned shall be able to :

1. Know the principles of collection, handling, storage and dispatch of clinical samples from patient, in a proper manner,
2. Perform and interpret in a proper manner the basic clinico- pathological procedures,
3. Have an understanding of the common haematological disorders and the investigations necessary to diagnose them and determine their prognosis,
4. Understand the concept of cell injury, the change produces thereby, in different tissues and organs and the body capacity for healing,
5. Understand normal haemostatic mechanism, the derangements of these mechanism and the effect on human system,
6. Understand the etiopathogenesis, the pathological effects, and the clinico pathological correlation of common infectious and non-infectious diseases,
7. Understand the concept of neoplasia with respect to etiology, gross and microscopic features, diagnosis and prognosis in different tissues and organs of the body,
8. Correlate normal and altered morphology (gross and microscopy) of different organ systems in different diseases to the extent needed of understanding of the disease processes and their clinical significance,
9. Have knowledge of common immunological disorders and their effects on human body.

Course contents

Course contents	Must know	Desirable to know
1. Cell injury		
• Cause and mechanism: Ischemic, Toxic and Apoptosis	✓	
• Reversible cell injury: Types, morphology, hyaline, fatty change	✓	
• Irreversible cell injury: Types of necrosis, gangrene	✓	
• Calcification: Dystrophic and metastatic	✓	
• Extracelluler accumulation: Amyloidosis, classification, pathogenesis, morphology	✓	
	✓	
2. Inflammation and repair		
• Acute inflammation: features, causes, vascular and cellular events.	✓	
• Morphological variant of acute inflammation	✓	
• Inflammatory cells and mediators	✓	
• Chronic inflammation: causes, types, non-specific and granulomatous with common examples	✓	
• Wound healing by primary and secondary union, factors promoting and delaying the process and complications	✓	

		Must know	Desirable to know
3.	Immunopathology		
	• Immune pathology: organization, cells, antibodies and regulations of immune responses	✓	
	• Hypersensitivity: types and examples, antibodies and cell mediated tissue injury with examples.	✓	
	• Autoimmune disorders like Systemic Lupus Erythematosus	✓	
	• Organ transplantation: immunological basis of rejection and graft versus host reaction	✓	
4.	Infectious diseases		
	• Mycobacterial diseases: tuberculosis and leprosy	✓	
	• Bacterial diseases: pyogenic, typhoid, dyptheria, gram –ve infections, bacillary dysentery, syphilis	✓	
	• Viral: polio, herpes, rabies, measles, rickettsial, chlamydial infections	✓	
	• Fungal disease and opportunistic infections:	✓	
	• Parasitic diseases: malaria, filaria, amoebiasis, kala azar, cystecercosis, hydatid	✓	
	• AIDS: etiology, modes of transmission, pathogenesis, pathology, complications, diagnostic procedures and handling of infected materials and health education	✓	
5.	Circulatory disturbances		
	• Oedema: pathogenesis and types	✓	
	• Chronic venous congestion: lung, liver, spleen	✓	
	• Thrombosis and embolism: formation, fate and effects	✓	
	• Infarction: types, common sites, gangrene	✓	
	• Shock: pathogenesis, types, morphological chances	✓	
6.	Growth disturbances		
	• Atrophy, hypertrophy, hyperplasia, hypoplasia, metaplasia, malformation, agenesis, dysplasia	✓	
	• Neoplasia: causes, classification, histogenesis, biological behaviour, benign and malignant, carcinoma and sarcoma	✓	
	• Malignant neoplasia: grades and stages, local and distant spread	✓	
	• Carcinogenesis: Environmental carcinogen, chemical, viral, occupational, hereditary and basics of molecular basis of cancer	✓	
	• Tumour and host interaction: systemic effects including para neoplastic syndrome , tumour immunology,		✓
	• Laboratory diagnosis: cytology, biopsy, tumour markers	✓	
	• Tumours and tumour like conditions of soft tissues	✓	
7.	Miscalleneous disorders		
	• Autosomal and sex-linked disorders with examples	✓	

		Must know	Desirable to know
	• Protein energy malnutrition and vitamin deficiency disorders	✓	
	• Radiation injuries		✓
	• Disorders of pigments and mineral metabolism such as billirubin, melanin, haemosiderin		✓
8.	Haemetopathology		
	• Anaemia: classification and clinical features	✓	
	• Nutritional anaemia: Iron deficiency, folic acid/ vit B 12 deficiency anaemia including pernicious anaemia	✓	
	• Haemolytic anaemia: classification and investigation	✓	
	• Hereditary haemolytic anaemia: thalassemia, sickle cell anaemia, hereditary spherocytosis and G 6 P D deficiency		✓
	• Acquired haemolytic anaemia:	✓	
	• Aplastic anemia	✓	
	• Haemostatic disorders: platlet deffeciency, ITP, drug induced, secondary	✓	
	• Coagulopathies: coagulation factor deffeciency, hemophilia, DIC and anticoagulant control	✓	
	• Leucocytic disorders: Leucocytosis, leucopoenia, leucamoid reaction	✓	
	• Acute and chronic leukemia: classification and diagnosis	✓	
	• Multiple myloma and dysproteinemias	✓	
	• Blood transfusion: grouping and cross matching untoward reactions, transmissible infections including HIV and hepatitis	✓	
	• Haemolytic anemias: autoimmune, alloimmune, drug induced, microangiopathic and malaria		✓
	• Myelodysplastic syndrome		✓
	• Myelo proliferative disorders: polycythemia, myelofibrosis		✓
9.	Cardiovascular pathology		
	• Rheumatic heart disease: pathogenesis and morphology	✓	
	• Infective endocarditis: causes and pathogenesis	✓	
	• Atherosclerosis and ischemic heart disease: myocardial infarction	✓	
	• Hypertension and hypertensive heart disease	✓	
	• Congenital heart disease: ASD, VSD, Fallot's teratology, Biscuspid aorotic PDA		✓
	• Pericarditis		✓
	• cardiomyopathy		✓
10.	Respiratory Pathology		
	• Inflammatory diseases of bronchi: chronic bronchitis, bronchial asthma, bronchiectasis	✓	

	Must know	Desirable to know
• Pneumonias: lobar, broncho, interstitial	✓	
• Lung abscess: etiopathogenesis and morphology	✓	
• Pulmonary tuberculosis: primary and secondary, morphologic types including pleuritis	✓	
• Emphysema: type and pathogenesis	✓	
• Tumors: benign, malignant, squamous cell, oat cell, adeno, etiopathogenesis	✓	
• Structure of bronchial tree and alveolar walls, normal and altered lung function, concepts of obstructive and restrictive lung disorders		✓
• Nasopharyngeal and laryngeal tumors		✓
• Occupational lung disorders: anthracosis, silicosis, asbestosis, mesothelioma		✓
• Atelectasis and hyaline membrane disease.		✓
11. Urinary tract pathology		
• Basics of impaired function and urinalysis	✓	
• Glomerulonephritis: classification, primary proliferative and non proliferative, secondary (SLE, polyarteritis, amyloidosis, diabetes)	✓	
• Nephritic syndrome	✓	
• Acute renal failure: acute tubular and cortical necrosis	✓	
• Pyelonephritis, reflux nephropathy, interstitial nephritis		✓
• Renal cell tumors: renal cell carcinoma, nephroblastoma		✓
• Urinary bladder: cystitis, carcinoma	✓	
• Progressive renal failure and end stage renal disease		✓
• Renal vascular disorders		✓
• Urinary tract tuberculosis		✓
• Nephrolithiasis and obstructive nephropathy		✓
• Renal malformation polycystic kidney		✓
12. Pathology of Gatrointestinal tract		
• Oral pathology: leukoplakia, carcinoma oral cavity and esophagus	✓	
• Peptic ulcer: etiopathogenesis and complications, gastritis types	✓	
• Tumors of stomach: benign, polyp, leiomyoma, malignant, adenocarcinoma, lymphoma	✓	
• Inflammatory disease of small intestine: typhoid, tuberculosis, Crohn's disease, appendicitis	✓	
• Inflammatory disease of large intestine: amoebic colitis, bacillary dysentery, ulcerative colitis	✓	
• Large and small intestine tumors: polyps, carcinoid, carcinoma, lymphoma	✓	

	Must know	Desirable to know
• Pancreatitis	✓	
• Salivary gland ttumors: mixed, adenoids, cystic, warthins		✓
• Ischemic and pseudomembranous enteroculitis, diverticulitis		✓
• Malabsorption-coeliac disease, tropical sprue and other causes		✓
• Pancreatic tumors: endocrine, exocrine and pariampullary		✓
13. Liver and Billiary tract pathology	✓	
• Jaundice: types, apathogenesis and differentiation	✓	
• Hepatitis: acute and chronic, etiology, pathogenesis and pathology	✓	
• Cirrohosis: etiology, classification, pathology, complications	✓	
• Portal hypertension: types and manifestation	✓	
• Diseases of gall bladder: cholecystitis, cholelithiasis, carcinoma	✓	
• Tumors of liver: hepatocelluler, metastatic, tumor markers	✓	
14. Lymphoreticular system		
• Lymphadenitis: non-specific, granulomatous	✓	
• Hodgkin's and Non-Hodgkin's lymphoma, classification, morphology		✓
• Diseases of spleen: spleenomegaly and effects	✓	
15. Reproductive system		
• Diseases of cervix: cervicitis, cervical carcinoma, etiology, cytological diagnosis	✓	
• Hormonal influences and histological apperances of different phases of menstrual cycles and the abnormality associated with it	✓	
• Diseases of uterus: endometrial hyperplasia and carcinoma, adenomyosis, smooth muscle tumours	✓	
• Trophoblastic diseases: hydatiform choriocarcinoma	✓	
• Diseases of breast: mastitis, abscess, fibrocystic disease, neoplastic lesions, fibroadenoma, carcinoma, phyllodes tumors	✓	
• Prostate: nodular hyperplasia, carcinoma	✓	
• Ovarian and testicular tumours	✓	
• Carcinoma of penis		✓
• Pelvic inflammatory disease including salpingitis	✓	
• Genital tuberculosis	✓	
16. Osteopathology		
• Osteomyelities: acute, chronic, tuberculosis	✓	
• Metabolic diseases: rickets/osteomalacia, osteoporosis, hyper parathyroidism	✓	
• Tumors: primary, osteosarcoma, osteoclastoma, Ewing's sarcoma, chondro sarcoma, metastatic	✓	

	Must know	Desirable to know
• Arthritis: rheumatoid, osteoid and tuberculosis	✓	
• Healing of fractures	✓	
17. Endocrine pathology		
• Diabetes mellitus: types, pathogenesis, pathology	✓	
• Non neoplastic lesion of thyroid: Iodine deficiency goiter, autoimmune thyroiditis, thyrotoxicosis, myxoedema	✓	
• Tumors of thyroid: adenoma, carcinoma: pappilary, follicular, medullary, anaplastic	✓	
• Adrenal disease: cortical hyperplasia, atrophy, tuberculosis, tumors of cortex and medulla		✓
• Parathyroid hyperplasia and tumors		✓
18. Neuropathology		
• Inflammatory disorders: pyogenic and tuberculous meningitis, brain abscess, tuberculoma	✓	
• CNS tumors-primary glioma and meningioma and metastatic		✓
• CSF and its disturbances: cerebral oedema, raised intracranial pressure		✓
• Cerebrovascular disease: atherosclerosis, thrombosis, embolism, aneurysm, hypoxia, infarction and hemorrhage	✓	
19. Dermatolopathology		
• Skin tumors: squamous cell, basal cell and melanoma		✓

Examination skills

Skills	P. Indep	Under Gui	Assist	Observe
1. Be able to collect, store and transport materials for various pathological tests including histopathology, Cytopathology, clinical pathology, haematology and biochemistry	✓			
2. Interpret abnormal laboratory values of common diseases	✓			
3. Do complete urine examination including microscopy	✓			
4. Do perform and interpret haemoglobin, TLC, DLC, ESR, PCV, bleeding time, clotting time, blood smears and red cell morphology	✓			
5. Interpret the peripheral smears of common disease's	✓			
6. Do blood grouping and cross matching	✓			
7. Adapt universal precautions for self protection against HIV and hepatitis, and counsel the patient	✓			

Practical:

1. One-third of allotted practical hours to be devoted to
    a. Performing a complete urine examination and detecting abnormalities and correlating with pathological changes
    b. To perform with accuracy and reliability basic haematological estimations : TLC, DLC, peripheral smear, staining, reporting along with history,
    c. To perform basic lab haematological tests like BT & CT
2. One third of allotted practical hours to be devoted to
    a. Identify and interpret gross and microscopic features of acute inflammations in organs such as appendix, lungs, meninges,
    b. Cellular components of chronic and granulomatous inflammation
    c. Granulation tissue, callous
    d. Typhoid, tuberculosis, amoebic ulcers in intestine
    e. Rhinosporidiasis, actinomycosis, mycetoma, molluscum contageosum,
    f. Amoebic liver abscess, malarial liver and spleen, filarial lymphadenitis, cysticercosis
    g. Fatty liver and kidney, amyloidosis of spleen, kidney and liver
    h. Types of necrosis: caseous, cogulative, liquifactive, fat
    i. Common systemic diseases
3. One third of allotted practical hours to be devoted to
    a. Discussion of case studies (paper) clinical, gross and microscopic features and other parameters wherever applicable to learn clinico pathological correlations

SUGGESTED TOPICS FOR INTEGRATED TEACHING

1. Immunology
2. Deficiency diseases
3. Genetics
4. Integrated seminars
    a. Rheumatic heart disease
    b. Ischemic heart disease
    c. Hypertension and Hypertensive heart disease
    d. Tuberculosis lung
    e. Nephrotic syndrome
    f. Inflammatory disease of small and large bowel
    g. Cirrhosis
    h. Metabolic bone disease
    i. Diabetes mellitus
    j. HIV/AIDS
    k. Iron deficiency anaemia
    l. Jaundice
    m. Malaria

TEACHING LEARNING METHODS:

- Structured interactive sessions
- Small group discussion
- Practical including demonstrations
- Problem based exercises
- Written case scenario
- Self learning tools
- Interactive learning
- e-modules

LEARNING RESOURCE MATERIALS

- Text books
- Reference books
- Practical note books
- Internet resources

TIME OF EVALUATION:

There should be regular formative assessment. Formative assessment, day-to-day performance should be given greater importance. Examination of Pathology should be at the end of 5th semester and formative assessment in middle of 3rd and 4th semester and summative assessment at the end of 5th semester.